

WHAT IS CLAIMED IS:

1. An industrial robot (1) having a structure comprising two or more reciprocally articulated elements (2, 3, 5, 7, 10) with possible angular movement, an electronic unit (14) for controlling a functional device (13, 13') carried by the frame of the robot (1), and at least a first optical fiber conductor (15), wherein the electronic unit (14) is in signal communication with the functional device (13, 13') through the first optical fiber conductor (15) for the transmission of control signals, and the first optical fiber conductor (15) is part of a signal cable (16) inserted into a tube (17), the outer section of the signal cable (16) having smaller dimensions than the dimensions of the inner section of the tube (17), so that the former can move within the latter.
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2. A robot according to claim 1, wherein at least a portion of the tube (17) extends within the structure of the robot (1).
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3. A robot according to claim 1, wherein the signal cable (16) comprises at least a second optical fiber conductor (15), the first and second conductor (15) being enclosed in a common coating (16A, 16B).
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4. A robot according to claim 1, wherein the signal cable (16) is made up of the first conductor (15) and a coating of said first conductor (15A).
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5. A robot according to claim 1, wherein the signal cable (16) comprises the first conductor (15) and at least a second optical fiber conductor (15), each conductor (15) having a respective coating (15B), the two conductors (15) being inserted into a common sheath (15C) extending within the tube (17).
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6. A robot according to claim 3, wherein the signal cable (16) comprises an inner insulator (16A), in which at least two optical fiber conductors (15) are
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dipped, and an outer coating (16B).

7. A robot according to claim 1, wherein a plurality of signal cables (16) are inserted into the tube (17), each comprising an optical fiber conductor (15) 5 and at least a respective coating (15A).

8. A robot according to claim 1, wherein the tube (17) is made of a flexible material resisting to flattening and/or compression, in particular polyurethane.

9. A robot according to claim 1, wherein said 10 structure of the robot (1) comprises a wrist device (10; 10').

10. A robot according to claim 9, wherein said structure of the robot (1) comprises:

- a base (2) and a upright (3) mounted onto the 15 base (2) for turning around a first axis (4) which is in vertical direction,

- an arm (5) mounted onto the upright (3) for swing around a second axis (6),

20 - a forearm (7) articulated to the arm (5) around a third axis (8) and capable of rotating around a respective fourth axis (9),

where the wrist device (10; 10') is supported by the forearm (7) with possibility of rotation around at least two axis (11, 12; 11', 12').

25 11. A robot according to claim 9, characterized in that the wrist device (10; 10') is a hollow wrist (10), as per claim 1 of European Patent No. 0 873 826.

12. A robot according to claim 11, wherein the functional device (13) is supported by the hollow wrist 30 (10).

13. A robot according to claim 10, wherein the tube (17) extends at least partly within the base (2), the upright (3) and the arm (5).

35 14. A robot according to claim 13, wherein the tube (17) extends at least partly also within the fore-

arm (7) and the wrist element (10).

15. A robot according to claim 9, wherein at least a portion of the tube (17) extends loosely outside along the forearm (7) and the wrist element (10').

5 16. A robot according to claim 1, wherein a main portion of the tube (17) extends outside along the structure of the robot (1).

10 17. A robot according to claim 1, wherein means (20-25) for guiding the tube (17) are associated to the structure of the robot (1).

15 18. A robot according to claim 17, wherein at least a part of the tube (17) extends along the frame of the robot (1) together with other electric cables and/or fluid pipes, so as to form a bundle guided through guiding means (20-25).

19. A robot according to claim 1, wherein the signal cable (16) is longer than the tube (17).

20 20. A robot according to claim 1, wherein a lubricant is present on at least one between the outer surface of the signal cable (16) and the inner surface of the tube (17).